

Utah Trauma Update: *Closed Head Injuries in Rural Utah*

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Utah Department of Health

A closed head injury may occur when the head sustains a substantial blow from a blunt object. In most cases, no bones are broken, but symptoms of a concussion or worse might ensue. In some situations, it can be difficult to identify a serious closed head injury. Some folks may appear “just fine” after a car crash, only to develop serious complications later due to bleeding inside the head. Thus, a life or death situation could develop hours after the initial injury.

In Utah, the trauma system is designed to ensure that injured patients are transported to hospitals certified to contain the appropriate services and expertise needed to treat a patient’s specific injuries. Level-1 and level-2 trauma centers are equipped to treat bleeding inside the head. However, when considering a closed head injury, the need to transfer a patient from a rural area to a distant trauma center may not be obvious due to delays in the appearance of symptoms.

Using information contained in the Utah Statewide Trauma Registry (2001 through 2004), can help identify patients most likely to suffer complications from a closed head injury and evaluate if head injured patients are appropriately transferred to trauma centers when needed. For example, figure 1 suggests that the bulk of closed head injuries occur among younger adults, with the injuries occurring among the elderly most likely to be lethal.

Figure 2 compares the injury severity and outcome of patients suffering closed head injuries in rural (397 patients) versus urban (600 patients) areas. The figure also compares outcomes for patients admitted locally, transferred to a Level-1 or 2 trauma center after initial assessment at a local hospital, and patients transferred directly from the scene of injury to a Level-1 or 2 trauma center. The figure suggests that injury severity (mean ISS) is similar across the groups, however, rates of death differ. The pattern of mortality suggests that, overall, appropriate transfer decisions are made, with lower death rates among patients admitted locally compared to medically complicated patients transferred to a trauma center. Higher rates of mortality among patients injured in urban areas may simply reflect the fact that patients suffering severe closed head injuries in rural areas are more likely to die at the scene.

Figure 1: Survival of Patients with Closed Head Injuries by Age

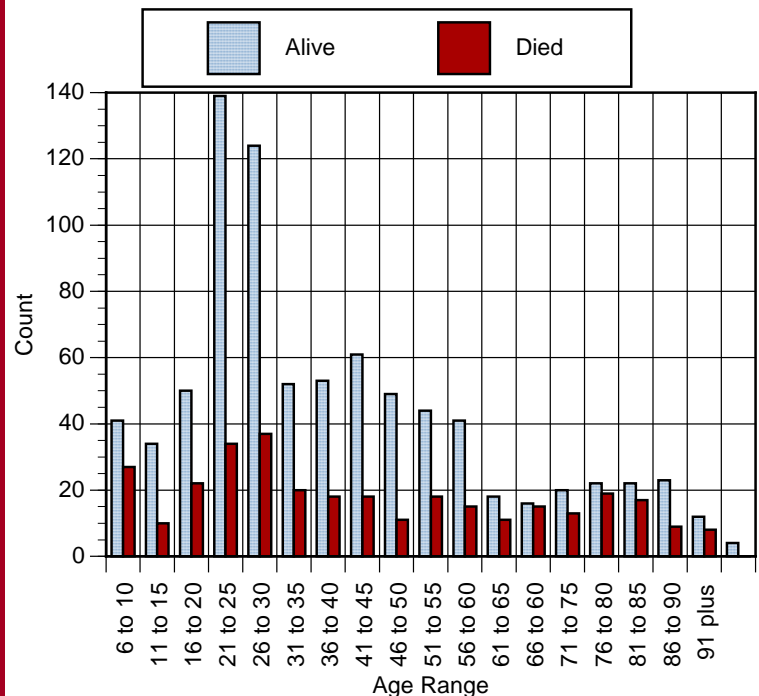
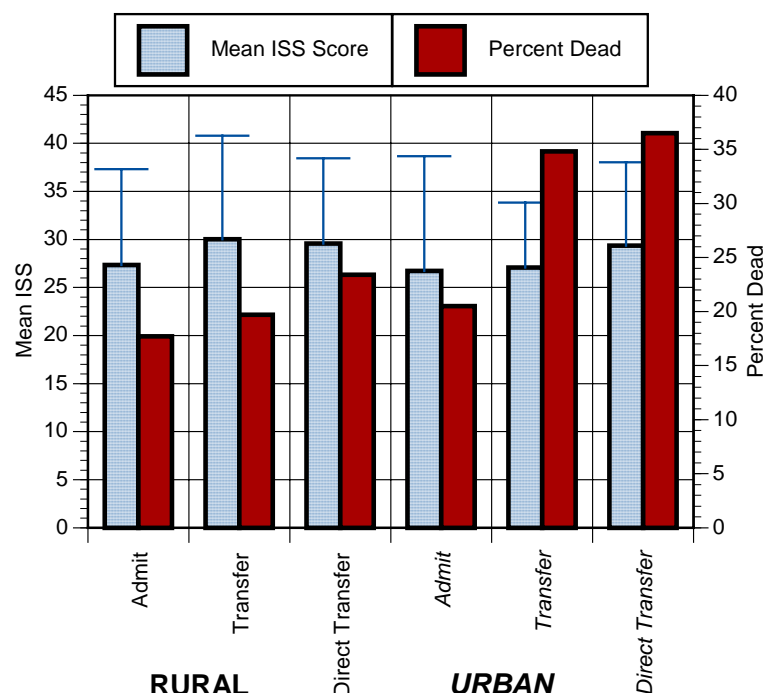


Figure 2: Injury Severity and Mortality by Transfer Status



Information contained in the Utah Statewide Trauma Registry provides only crude measures describing the outcome of patients suffering a closed head injury (i.e., lived or died). More appropriate measures of patient outcome might include functional abilities after injury or satisfaction with life. Although not available, it is possible to assess some processes of care and crude measures of resource utilization for patients with closed head injuries using the registry.

Figure 3 compares the elapsed time patients with closed head injuries spent in the initial emergency department (ED) before admission or transfer to a Level-1 or 2 trauma center. For patients admitted locally or transferred after initial assessment in the local hospital, time spent in the local ED appears as a blue bar. For patients directly transported to a Level-1 or 2 trauma center from the scene of injury, time spent in the trauma center ED appears as a red bar.

Figure 3 suggests that patients transferred from local hospitals spend added time in the ED before the transfer is initiated, with patients in rural areas spending twice as much time in the ED as patients in urban areas. It may be that transferred patients are more severely injured and require additional time to assess and stabilize. However, when comparing patients transferred from local EDs and patients directly transferred to trauma centers, patients assessed in local hospitals spend twice as much time in the ED before transfer (blue bar) compared to the time spent in the ED among patients directly transported to trauma center (red bar).

Figure 4 compares hospital length of stay for patients injured in rural versus urban areas and differences in length of stay by transfer status. The figure suggests that patients transferred to a trauma center spend more time in the hospital compared to admitted patients. Interestingly, patients with closed head injuries transported from rural areas spend between 2 and 4 additional days in the hospital compared to patients transported from urban areas.

Findings presented in this fact sheet suggest that appropriate decisions are made regarding the need to transfer a patient with a closed head injury from a local hospital to a trauma center. It may be possible, however, to reduce the time necessary to make the decision to transfer and transport the patient to a higher level of care. Reducing the time to reach definitive care may improve outcomes and reduce resources expended to care for patients with closed head injuries.

Figure 3: Elapsed Time in the ED for Head Injured Patients by Transfer Status

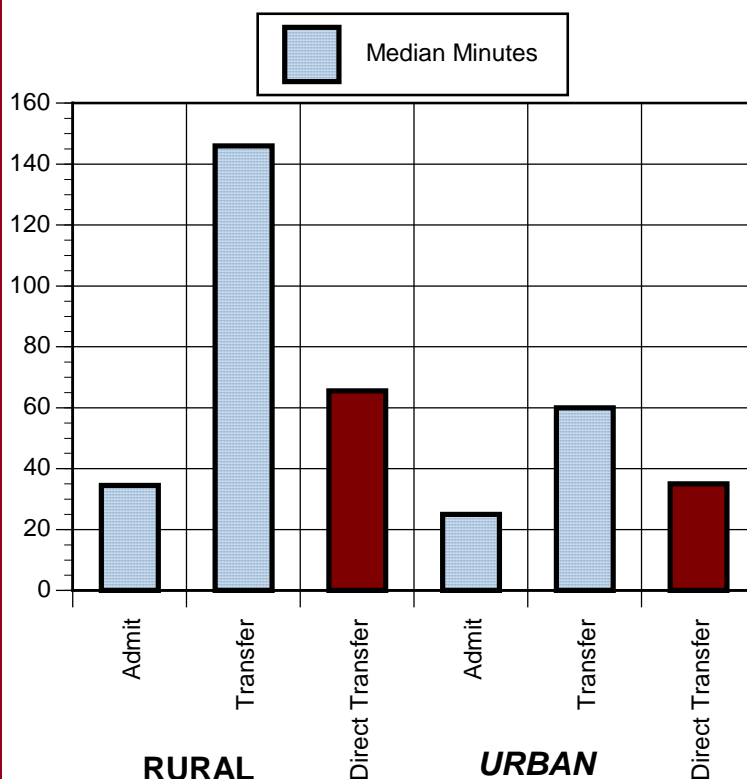


Figure 4: Hospital Length of Stay for Head Injured Patients by Transfer Status

